http://dlippman.imathas.com/graphcalc/graphcalc.html

Let P = (x,y) be a point on the graph of $y = x^2 - 8$.

(a) Express the distance d from P to the origin as a function of x.

$d(x) = \sqrt{x^4 - 15x^2 + 64}$

(b) What is d if x = 0?

d(0) = 8 (Round to two decimal places.)

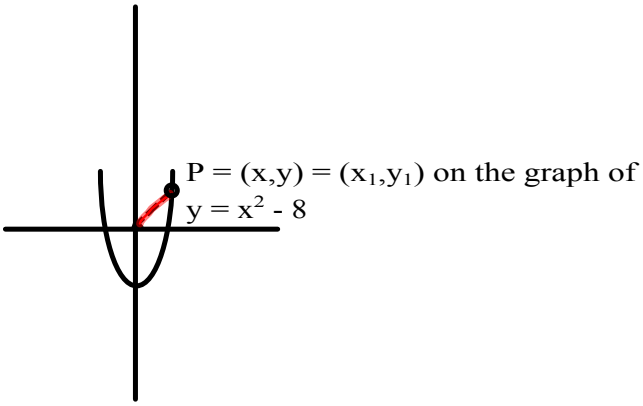
(c) What is d if x = 1?

d(1) = 7.07 (Round to two decimal places.)

Use a graphing utility to graph d = d(x) in order to answer the following question.

(d) For what positive value of x is d smallest?

x = ☐ (Round to two decimal places.)


P = (x,y) = (x1,y1) on the graph of
y = x2 - 8

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§1.6 # 1a, etc.

$P=(x,y)$ is a point on $y=x^2-8$.

Express distance from P to the origin:

$P=(x,y)=(x,x^2-8)$, since $y=x^2-8$!

$=(x_1,y_1)$

Let origin $=(0,0)=(x_2,y_2)$. Then distance from P to origin is

$$D=\sqrt{(x_2-x_1)^2+(y_2-y_1)^2}=\sqrt{(x_1-x_2)^2+(y_1-y_2)^2},$$

which is the same thing, but easier to work this problem with labels I chose, so

$$D=\sqrt{(x-0)^2+(x^2-8-0)^2}$$

$$=\sqrt{x^2+(x^2-8)^2}$$

$$=\sqrt{x^2+x^4-16x^2+64}$$

$$=\sqrt{x^4-15x^2+64}$$

↳ The distance function.

$(x^2-8)^2$

$=(x^2)^2-2(x^2)(8)+8^2$

$=x^4-16x^2+64$